REMARKS

Claims 1 and 3-15 remain in this application. Claims 2 and 16 have been cancelled. Claim1 has been amended to include the limitation of claim 2. Claims 3-4, and 6-7 have been written in independent form. Claims 5, 8, 12-13 and 15 have been amended to better define Applicants invention. With claim 16 cancelled, the Examiner's specification objection and rejections under 35 U.S.C.§112 are moot. Amended claim 5 overcomes the objection to that claim.

Claims 1-9 and 11 were rejected over Shofner in view of Iwasaki et al. In the Office Action, page 4, second paragraph, the Examiner alleges that Shofner's probe (97) is controlled and operated by a mechanism (96), which may be connected to computer (78) and controller (80). However, the probe in Shofner is provided to lift-out a minute sample in a light optical microscope and accordingly, there is less technical necessity of connecting the probe with the computer and the controller which are provided in order to control the Focused Ion Beam device, which is a separate device from the light optical microscope. There is no support for the Examiner's contention in Fig. 4 or its description at col. 5. Fig. 4 shows a self-standing controller 96 which is not shown or suggested as connected to computer (78) and controller (80). Therefore the Examiner's allegation is not correct.

The probe in Shofner merely varies the position of the minute sample and Shofner does not describe to varying the attitude of the minute sample. Shofner suggests that a second focused ion beam device could be mounted within the chamber 51, but it does not at all describe providing an additional electron beam in the chamber and arranging the probe within the electron beam apparatus

An object of the present invention is to make it possible to perform perpendicular section observation of the minute sample cut out from the sample without taking it out of the vacuum container. Therefore, in the present invention, (A) the focused ion beam optical system and the electron beam optical system are mounted in a common vacuum container, and (B) the probe has the function of varying the attitude and angle of the minute sample cut out by the focused ion beam so as to position the section of the minute sample perpendicular to the axis of the electron beam within the vacuum container.

With these structures, it is possible to avoid the case where, when the beam is obliquely applied, information of another material is detected, and it becomes possible to perform, with

high accuracy, inspection of a sample, such as a barrier metal, of which correct observation cannot be performed because an oxide film is formed when exposed to the atmosphere.

This specific advantage of the present invention can be firstly realized by having the above described features (A) and (B). Shofner does not describe these features, which are found in some form or another in each of claims 1-11.

Iwsasaki describes the feature (A) but it does not describe or suggest the combination of the features (A) and (B).

Iwasaki describes observing a section of the sample, which is merely formed by the focused ion beam, by means of the electron beam. That is all. It does not describe cutting out the minute sample from the sample disposed on the stage. Nor does it disclose varying the attitude of the minute sample and observing the sample that has been manipulated by means of the electron beam. Accordingly, in the apparatus of Iwasaki, it is not possible to observe an internal vertical section of a large sample, e.g., a semiconductor wafer.

In order to observe an internal vertical section of a large sample, like the presently claimed invention, it is necessary to cut out a minute sample having a vertical section and to adjust the attitude of the minute sample with respect to the electron beam. It is not possible to observe a section of a desired portion of the large sample only by arranging a focused ion beam and an electron beam in the vertical direction.

Further, in both Shofner and Iwasaki, there is no disclosure or suggestion as to application of an electron beam in an arrangement in which the minute sample is supported by a probe. For example, Shofner discloses using the probe as means for moving the minute sample to the TEM grid and the like instead of performing processing or observation at a time when the minute sample is supported by the probe.

It is thus clear that claims 1-11 distinguish over the combination of Shofner and Iwasaki et al. and should be allowed. (Moore cited against claim 10 does not make up for the deficiencies in the first two references.)

Claims 12-15 are directed to reducing the space occupied by an apparatus while maintaining the rigidity of a probe introduced from the outside of a vacuum container in which a large sample such as a semiconductor wafer is processed. Claims 12 and 16 were rejected over

Ohnishi et al. in view of Masaru et al. To reject claims 13-15, Shofner was added to this combination. With its cancellation, the rejection of claim 16 is moot.

Like Masaru, in a case where a probe is introduced from a direction parallel to the surface of the sample stage, it is necessary to introduce the probe from outside over a broad range including the moving range of the sample stage. Consequently, an extremely long member (probe) must be supported in the horizontal direction and a problem of rigidity of the probe occurs.

As presently claimed, the apparatus is structured so that the probe is introduced from a direction slanted with respect to the surface of the sample stage and accordingly, the above-described problem never occurs. The probe can be introduced to a desired portion and the occupied space of the apparatus can be reduced.

Ohonishi contains no teaching concerning the introduction direction of the probe.

Shofner discloses, in Fig. 4, a probe extending from a direction slanted with respect to the surface of the sample stage, but it does not describe anything about movement of the stage. Furthermore, since the device of Shofner is a light optical microscope, a vacuum container is not needed. One would not then be led to substitute Shofner's angled probe for the parallel probe of Masaru, particularly when one considers the airlock structure of Masaru.

It is only in Applicant's specification that one finds any suggestion of combining the various claimed features including the movable stage, the slanted probe, and the vacuum chamber containing the stage and into which the slanted probe is introduced. Thus, claims 12-15 distinguish over these references and should be allowed.

In view of the above, all claims are now in condition for allowance, prompt notice of which is respectfully solicited.

The Examiner is invited to call the undersigned at (202) 220-4200 to discuss any information concerning this application.

Applicants respectfully request a two month Extension of Time to respond to the Office Action of January 15, 2003. The extended period expires June 15, 2003.

The Office is hereby authorized to charge the fee of $410.00 for a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) and any additional fees under 37 C.F.R. § 1.16 or § 1.17 or credit any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

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